WHAT IS CLAIMED IS:

1. A fractional multi-modulus prescaler comprising:

a polyphase filter having an input frequency signal and producing one or more output phase signals having a phase difference of 90 degrees relative to one another;

a multiplexer coupled to said polyphase filter for selecting said one or more output phase signals in response to a multiplexer control signal;

an asynchronous divide-by-N divider coupled to said multiplexer for receiving at its input said one or more selected output phase signals and generating an output frequency signal;

a phase control for generating said multiplexer control signal in response to the presence of an input D-CTRL word signal, a MOD signal and a feedback signal generated by said divide-by-N divider, whereby said output frequency signal is a desired fractional multiple of said input frequency signal.

2. The fractional multi-modulus prescaler as defined in claim 1, further comprising said phase control being disabled in response to a "low" MOD signal, whereby the division ratio is N.

3. The fractional multi-modulus prescaler as defined in claim 1, further comprising said phase control being enabled in response to a "high" MOD signal to generate said multiplexer control signal.

4. The fractional multi-modulus prescaler as defined in claim 3, further comprising said phase control generating said multiplexer control signal in accordance with the value of said D-CTRL word signal and said divide-by-N divider feedback signal, whereby said multiplexer selects an output phase signal corresponding to said D-CTRL word signal.

5. The fractional multi-modulus prescaler as defined in claim 4, wherein the division ratio is $N + C/4$, where the value of C corresponds to the number of changes of the multiplexer control signal in one period of the output frequency signal.

6. The fractional multi-modulus prescaler as defined in claim 5, wherein the division ratio is N + 1 when the multiplexer control signal changes four times in one period of the output frequency signal.

7. The fractional multi-modulus prescaler as defined in claim 1, wherein the input frequency signal is a differential signal.

8. The fractional multi-modulus prescaler as defined in claim 5, further comprising said multiplexer selecting a desired output phase signal more frequently to increase the division ratio and less frequently to lower the division ratio.

9. A fractional multi-modulus prescaler for use in a phase locked loop fractional-N frequency synthesizer comprising:

means for providing a quadrature signal from the frequency synthesizer output frequency signal;

means for selecting a phase of said quadrature signal in accordance with a phase select control signal corresponding to the number of the modulus;

means for applying a division function to the selected phase signal for each of the phase signals selected during a modulus time period, said modulus time period being defined as starting from an original selected phase signal and returning to the original selected phase signal; and

means for returning said phase selecting means to the original selected phase prior to said phase selecting means responding to a subsequent phase select control signal, whereby the generation of multi-modulus spurious frequency signals is prevented.

10. The fractional multi-modulus prescaler as defined in claim 9, wherein the phase signals are selected more frequently to increase the ratio of the division function and less frequently to decrease the ratio of the division function.

11. The fractional multi-modulus prescaler as defined in claim 9, wherein said phase selecting means selects two phases of the quadrature signal, whereby the multi-modulus prescaler is a dual-modulus prescaler.

12. The fractional multi-modulus prescaler as defined in claim 9, wherein said phase selecting means selects four phases of the quadrature signal, whereby the multi-modulus prescaler is a four-modulus prescaler.

13. A method for providing a spurious frequency-free multi-modulus prescaler comprising the steps of:

providing a quadrature signal corresponding to the output frequency signal of a voltage-controlled oscillator in a phase locked loop fractional-N frequency synthesizer;

selecting one or more phases of the quadrature signal in accordance with a phase select control signal corresponding to the number of the modulus;

applying a division function to the selected phase signal for each of the phase signals selected during a modulus time period to generate the desired fractional multiple of the input reference frequency; and

returning to an original selected phase of the quadrature signal prior to responding to a subsequent phase select control signal whereby the generation of multi-modulus spurious frequency signals is prevented.